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ABSTRACT

A specialized research training institute was conducted for 58 college professors who were engaged in Consortium Research Development (CORD) projects. An attempt was made to diagnose specific deficiencies in existing educational research and development competencies among the participants and to provide them with concentrated experiences to increase their knowledge and skill in as many areas as time permitted. These areas included: (1) specifying objectives in behavioral criterion form; (2) test construction; (3) task analysis and instructional specifications; (4) instructional systems development; (5) research design; (6) data analysis; and (7) proposal and report writing. This report gives a description of the program, and evaluation and general conclusions. A list of the participants, the schedule for the institute, the post-tests, and the written evaluation form are included in the appendices. (AF)

ED040687

Final Report
Project No. 8-0547

National Research Training Institute for Participants in the Research Development Grants Program

Dale G. Hamreus
Teaching Research
a Division of the Oregon
State System of Higher Education
Monmouth, Oregon

April, 1969

The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their porfessional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

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PREFACE

The research training institute held at Traverse City, Michigan, and reported herein was a replication of a similar institute held last year in Monmouth, Oregon. The participants for the Traverse City Institute were, like those at the Monmouth Institute, college level professors who were engaged in a research development grant project on a small college campus. Unlike the institute held in Monmouth, responsibility for the Traverse City Institute was divided into two parts: the instructional aspects of the institute were in the hands of the Teaching Research Division of the Oregon State System of Higher Education and all administrative matters of institute coordination were in the hands of the Continuing Education Center, Michigan State University, at Traverse City, Michigan. The management functions needed for effective and efficient operation of the institute were thus the responsibility of the Institute Coordinator at the Michigan State University Center and included providing for instructional space and facilities, participant housing, food and accommodations, liesure time arrangements, and other such activities.

Summary

There is a general awareness that many small college academicians lack the knwledge and specialized skills required for the conduct of instructional research and development. The research training institute reported herein attempted to diagnose specific deficiencies in existing educational research and development competencies among 58 small college professors after they had been provided an opportunity to study and review such competencies, and then provided them concentrated experiences to increase their knowledge and skills in as many areas as time permitted. For each participant not demonstrating such competencies at the termination of the institute, an individualized program of study was devised in each of the areas in which he was deficinet so that he could continue to pursue those topics on his own.

The objectives of the institute were to develop competencies in the following areas:

(a) Specifying objectives in behavioral criterion form

(b) Test construction

(c) Task analysis and instructional specifications

(d) Instructional systems development

(e) Research Design

(f) Data Analysis

(g) Proposal and report writing

The research training institute was held at Traverse City, Michigan with instructional responsibilities given to The Teaching Research Division, Oregon State System of Higher Education, and institute management and coordination the responsiblity of the Continuing Education Center, Michigan State University.

Participants were provided self-instructional materials for each topic and time scheduled for systematic study during the institute. Each topic was then presented in a large group-paced programed sequence. At the completion of the group-paced presentation participants were grouped into small seminars or individual instructional sessions for additional study. Those individuals achieving competence on each topic before the allotted time were encouraged and given guidance in preparing either a research proposal or the development of a system of instruction relevant to his area of interst.

Criterion test results as well as written and oral evaluations indicated that the institute objectives were achieved.

It was recommended that if a similar institute were conducted that

1. The institute should be separated into two sections: research and development.

2. That trainees be screened for interest in either research and development and scheduled accordingly.

3. That the physical location of the institute be at the institution responsible for the instruction.

Introduction

To facilitate the basic objectives of the various consortium research development (CORD) projects, a specialized educational research training institute was conducted for college professors who were currently participating in a research development grant project. This group numbering 58 professors met at the Continuing Education Center of the Michigan State University at Traverse City during the two week period beginning August 18 and ending on August 30, 1968. The institute was designed to provide a set of learning experiences to the participants which would increase their competencies in research methods in order that they might improve their courses of instruction through research and enable them to engender educational research activities within their spheres of influence.

Empirical development of courses of instruction requires several specialized skills and utilizes a newly evolving knowledge base. The diversity of CORD institutions and backgrounds of participating professors suggested that considerable flexibility be programed into the institute activities. In addition, there was general awareness that many academicians lacked knowledge and specialized skills required for the conduct of research and development activities. With this in mind, provisions were made to identify specific deficiencies in existing educational research and development competencies among participants after they had been provided an opportunity to review such competencies, and then provided them concentrated experiences to increase their knowledge and skill in as many of those deficient areas as time permitted. If such competencies were not demonstrated at the termination of the formal institute, individualized programs of study were devised for each participant in each of his need areas, thus enabling him to continue to pursue those topics on his own if he desired.

Objectives

The specific objectives of the institute were to develop competencies in the following areas:

(a) specifying objectives in behavioral criterion form. This included the statement of objectives for instructional systems design purposes, their modification and refinement in developmental phases, and their revision and simplification for dissemination.

(b) Test construction. This included information on the procedures used in the selection and development of appropriate criterion measures for various types of behavioral objectives, and techniques for assessing absolute criterion performance vs. relative performance.

(c) Task analysis and instructional specifications. This included information on hierarchical task analysis and techniques for specifying instructional requirements of various kinds to achieve task related behaviors.

(d) Instructional systems development. This included experimental operations and procedures, development of external control strategies, instructional monitoring procedures, and evaluation-revision operation revisions to maximize the learning effects of each instructional element.

(e) Research design. This included information on "within group" variance and the identification of learner variables relevant to the learning experience, alternative experimental designs, the manipulable and non-manipulable variables, types of research studies, and operations research methods.

(f) Data analysis. This included selection of appropriate statistical techniques for analysis of evaluation and/or experimental data, and the use of computers in the process of analysis.

(g) Proposal and report writing. This included information as to the components of the research proposal, the use of operational language, and the key role of evaluation of the educational product, and/or the experiment itself--including limitations, inferences, implications, and description of new questions raised and additional experimentation required.

Trainees

The training group consisted of a total of 62 participants, 58 of whom were college professors selected by the various U.S. Office of Education Regional Research Program Directors from those institutions of higher learning cooperating in the CORD program, and the remaining four participants, U.S. Office of Education observers representing the Bureau of Research. A complete roster of the institute participants is contained in Appendix A.

The participants represented a very diverse population of professional backgrounds. The breakdown was as follows:

OE/DHEW	4
English	1
Higher Education Administration	9
Psychology	3
History	1
Music	2

Education	9
Natural Science	2
Biological Science	2
Sociology	3
Guidance and Counseling	2
Chemistry	2
Institutional Research	9
Dean of Students	2
Child Study	1
Dietician	1
Other	9

DESCRIPTION OF THE PROGRAM

Pre-institue preparations consisted of two major activities: First, the procurement of instructional materials for use in the institute; and second, the necessary communications to participants prior to the institute.

The instructional staff utilized the group and self-instructional materials previously developed under a Small Porject Research contract. The materials center on seven (7) topics essential to educational research and development. Four of the topics relate most directly to development of new instructional systems. The three remaining topics relate most directly to planning and conducting research on instructional systems and reporting research results. The complete set of self-study materials accompanied the final report of the Monmouth Oregon Institute and are avaiable from ERIC.

Because of the nature of the program it was expected that there would be a wide variance in the abilities and experiences of the participants. Therefore, the institute was designed to identify strengths and weaknesses of each participant in each topic area and to provide, as much as possible, the necessary background experience and the individualized program required to make it an optimal learning experience for each participant.

Participants were provided self-instructional materials for each topic, a criterion test, and small group or individual remedial instruction as required. Those who demonstrated competence in all topics before the termination of the institute undertook the preparation of a proposal for research, or the development of an instructional system relevant to their own area of interest under the supervision of a member of the institute staff. Those who did not demonstrate competence in all topics prior to the termination of the institute were provided individual programs of study to be continued after the institute which would lead ultimately to the competencies needed to achieve the objectives of the Research Development Grant program.

Behavioral topics and staff members responsible for them were:

Behavioral Topics	Topic Specialists
Specifying Objectives	Dr. Casper F. Paulson
Task Analysis and Instructional Specification	Dr. Paul Twelker
Instructional Systems Development	Dr. Dale Hamreus
Test Construction (Measurement)	Dr. Del Schalock
Research Design	Dr. Jack Crawford
Data Analysis I & II	Dr. James Beaird
Proposal and Report Writing	Dr. Jack Crawford

Topics were covered in sequence after an orientation and overview session. The emphasis of the first week of the institute, as indicated by the first three topics, was primarily on the development of new instructional systems. The second week was devoted primarily to planning and implementing research on instruction and curriculum innovations. The institute was concluded with a summary and evaluation session.

As the institute progressed the participants began to identify their interests around either the area of development or research. During the fourth day of the Institute, these interests became sufficiently clarified that afternoon small group study sessions were formed accordingly. Additional comments about interest grouping will be made under the section on evaluation.

A typical daily schedule was as follows:

8:00 to 9:45 A.M. Group-paced Topic Presentation: This was a carefully prepared, pre-tested, learning experience on one of the institute topics requiring active response from participants and providing feedback to the presenter on the percentage of students responding correctly and an individual record of errors made by each student.

9:45 - 10:00 A.M. Break

10:00 - 11:00 A.M. Administration of Criterion Test: The scores on each topic criterion test were used to group students homogeneously for further study of each topic.

11:00 - 12:00 Noon. Independent and Small Group Study: Individuals experiencing difficulty in common subtopics worked together under the guidance of staff member in an individual tutorial, or seminar type situation in order to gain competence in the specified behavior.

12:00 - 1:30 P.M. Lunch.

1:30 - 4:00 P.M. Independent and Small Group Study: This was a continuation of the work undertaken in the morning. Some individuals demonstrated sufficient competence in the topic to apply the behavior to the development of a research proposal relevant to his own area of interest.

4:00 - 5:00 P.M. Group Meeting (Interaction): A discussion session was held where ideas of the day were exchanged -- reactions, comments, questions, housekeeping details, etc.

7:00 - 10:00 P.M. Independent Study: During this period the participant studied the specially prepared self-instructional materials on the topic scheduled for the following day.

The complete institute schedule is contained in Appendix B.

Evaluation

Three forms of evaluation were employed: 1) a simple post-test measure of criterion scores designed to determine what learning gains resulted from the institute; 2) participants' written appraisals of the institute on a prepared evaluation form; and 3) participants' summary and evaluative comments obtained during the final two hour institute session devoted specifically to that purpose. Each of these evaluations are summarized below.

Post-Test gain scores

During the institute held in Monouth, Oregon the previous year, a pre-post-test design was followed for evaluation. This design was dropped during the Traverse City Institute in favor of a post-test only design for two reasons: (1) base line data had been obtained from the previous institute which could be used to fairly represent the level of ability of the participants in the Traverse City Institute in that they were drawn from the same general population; and (2) the time lost and the contamination resulting from a pre-test during the two week training period strongly urged that the pre-test be dropped.

The results of Monmouth Institute pre-and Traverse City post-test scores on criterion measures for each institute topic and total scores of all measures are shown in Table 1. Copies of tests for each topic are contained in Appendix C.

Table 1

Means, Standard Deviations, Ranges, and Total Possible Points of All Separate Criterion Scores and Total Test Scores for All Monmouth Institute Pre- and Traverse City Post-test Measures.

Criterion Measure		N	Mean	Standard Deviation	Range	Total Points Possible
Behavioral Objectives	Pre-	24	31.29	11.16	7-47	60
	Post	35	43.23	4.98	34-48	49
Objective Analysis	Pre-	24	10.67	1.86	7-14	18
	Post	35	62.57	9.95	45-80	90
Instructional Development	Pre-	24	15.08	4.53	10-22	44
	Post	35	22.37	4.98	13-32	47
Measurement	Pre-	24	12.52	2.65	8-16	44
	Post	35	47.65	12.08	16-63	119
Experimental Design	Pre-	22	1.45	1.77	0-6	7
	Post	35	5.83	1.26	3-7	7
Data Analysis I	Pre-	24	6.50	2.52	1-11	20
	Post	35	11.94	3.33	3-18	20
Data Analysis II	Pre-	24	1.58	2.94	0-8	16
	Post	35	5.84	3.14	0-12	20
Total of all Measures	Pre-	22	79.38	19.05	41-115	209
	Post	35	199.44	26.21	130-250	352

Inspection of Table 1 reveals that post-test scores were higher than pre-test means in all cases. Although total possible points differed between pre- and post-test measures in several instances the trend for all measures as indicated by means and range scores was sufficiently great to indicate that changes in behavior in the direction desired did occur.

Individual Written Evaluations

The second form of evaluation required participants, at the close of the institute, to complete an evaluation form containing seven broad questions. Participants were requested to (1) identify which instructional section was most relevant to their professional needs, (2) list ways in which their answers to the first question would influence their subsequent job performance, (3) suggest improvements to the instruction in the Institute, (4) recommend elements to eliminate or de-emphasize in the instruction, (5) write at least one positive and one negative comment regarding various functions of the institute, (6) react to how, if at all, they might change a paragraph they had written at the beginning of the institute, and (7) comment on anything in general about the institute.

During the fourth session of the institute on measurement, participants expressed a concern that small group study sessions were not providing maximum learning opportunity because of the diverse interests in the participants. Subsequent study sessions were therefore grouped according to participants' major interests of either research or development. The results of participants' ratings to the written evaluation have been summarized to reflect these groupings and are listed under three headings: total group, research interest group and development interest group. Summaries are shown in Table 2.

Table 2

Tallies of Participants' Written Summaries

TOTAL = 35
RESEARCH = 21
DEVELOPMENT = 14

	Total	Research	Development
1. What instruction did you find most relevant to your professional needs?			
Advanced Analysis	14	14	-
Proposal Development	12	7	5
Research Design	12	12	-
Behavioral Objectives	10	5	5
Measurement	9	9	-
Teacher-Models	7	3	4
All sections	5	2	3
Prototype Development	4	2	2
Systems Approach	3	1	2
Evaluation	2	1	1
Games	2	1	1
Report Writing	1	1	-
Personnel Conferences	1	1	-

	Total	Research	Development
2. In what ways will the things you described in (1) influence the performance of your job in the coming year?			
Motivated to do research in instructional methods and counseling techniques.	18	12	6
Improve instructional procedure	8	7	1
Increase awareness of objectives approach	7	4	3
3. What could be added or changed to make the instruction more useful and effective?			
Small group interaction in learning and study	9	7	2
More effective orientation	9	7	2
More visual aids	7	3	4
Better organization	6	4	2
Rewriting	2	1	1
4. What do you feel should be eliminated or de-emphasized?			
Less time on different systems	12	8	4
Depends upon participants	5	3	2
Repeat of manual	3	2	1
Data analysis optional	2	2	-
Criterion tests for two weeks	2	1	1
Exam in manner of which it was given; better to have given sections of it with instructional units.	1	0	1
5. Please write at least one positive and one negative comment on each of the following:			
(a) reading materials			
Adequate-challenging	18	10	8
Some areas not sufficiently clear	11	9	2
Unorganized	10	7	3
(b) small group activities			
Discussion group good	20	10	10
Arrangement poor	6	5	1
Lengthy	5	4	1
Several good options	1	1	0

	Total	Research	Development
(c) flexibility of the program			
Excelllent	4	2	2
Good	1	0	1
Rather flexible and subject to justifiable change-some staff still had enough ego involvement to show slight hostilites at strong criticism.	5	2	-
Good during latter part, plus inventory first day could have provided data for structuring small groups.	2	2	0
Quite flexible-allowing participants to pursue worthwhile areas of personal use and effort to meet needs of everyone	8	6	2
Too rigid first 3 or 4 days.	4	4	0
Unending flexibility is not necessary for this program-some is needed for meeting individual needs.	3	3	0
Large groups rather inflexible	1	1	0
Might be bad if too flexible and only most outspoken members are needed.	1	1	0
Too many options at times.	3	1	2
(d) interaction with staff and other participants.			
Excellent	6	3	3
Good	7	2	5
Friendly and sensitive	3	3	0
Opportunities for informal contacts	3	2	1
Staff available at all times.	9	8	1
Poor beginning.	2	1	1
More interaction could have been encouraged by numerous methods.	3	3	0
Somewhat distant	1	1	-
One staff member made you feel inferior	1	1	0
Few staff carried the burden for all.	1	1	0
6. On the first day of the institute, you wrote a paragraph on some point of disagreement with the general orientation chapter. How if at all, would you modify now what you wrote then?			
No change	17	10	7
Educational research-more preparation	11	8	3
Teacher-students, more participation	2	0	2

	Total	Research	Development
More confidence in teaching direction	1	1	0
Detailed information needed before workshop.	1	1	0
7. There must be something we've overlooked in our evaluation. Please answer (a) or (b)			
(a) You must be kidding! I have writer's cramp already.	7	6	1
(b) What I really wanted to tell you, but you never asked, is:			
Teaching Research is a scholarly, creative group which has a great deal to offer higher education.	1	1	0
This has been a wonderful experience for me.	6	3	3
See memo of August 30.	1	0	1
Let's have more of these for the people who didn't get here.	1	1	0
Pre-institute communication about program content.	1	1	0
Motivation still the most powerful force in teaching-not method or strategy which ignores it.	1	0	1
Two weeks were very enriching.	1	0	1
Institute should have been held where there were more library facilities.	1	1	0
Lack of preparation.	1	0	1
Original program should have been carried out.	1	0	1
Second week right up my alley. Belief that I am a better professional as a result of attending this workshop.	1	1	0
Great group.	1	1	0

From Table 2 several things can be noted. Responses to question one indicated that the research interest group found analysis, design, and measurement instruction most relevant whereas the development interest group found proposal writing and behavioral objectives most relevant. Under question five, the research interest group considered the first 3 or 4 days of the institute (devoted to development issues) as too rigid, whereas the development interest group was apparently satisfied with the flexibility provided.

Both groups indicated receiving strong influence from the instruction in the institute to conduct research in instruction and counseling when they returned to their institutions.

Responses to question four indicated that if a single problem or example could have been developed to run through all sections of the manual it was felt it would have strengthened the instruction considerably.

In general, participants rated the reading materials as adequate to challenging, the small group activities as good, the flexibility of the program as quite flexible, and the staff interaction as good and available at all time.

Group Oral Evaluation

The third level of evaluation consisted of a concluding two hour group meeting with participants and staff to summarize and evaluate the institute. More than fifty different suggestions were made including reference to written materials, small group study, scheduling, group interaction, institute organization and "warm blanket" services.

The most notable outcome from this evaluation was the wide differences of opinion among the participants in terms of what they liked and disliked about the institute. Little agreement was obtained and other than letting institute members get things "off their chest", little was gained beyond the written evaluations.

Agreement was expressed, however, that much more value than simple research skill attainment emerged from the institute. Participants indicated that they had acquired a broad understanding of how to better help others at their home institutions and expressed a general confidence and optimism about plans for writing proposals and carrying out instructional research of their own.

General Conclusions

In general, it was concluded that the institute did achieve its stated objectives and even more, as was noted above.

The following changes are recommended if a similar institute were to be conducted.

1. The institute should be separated into two distinct sections: one with a research emphasis and one with a development emphasis. Measurement and proposal writing should be common to both.

2. Trainees should be screened for interest in either research or development and scheduled accordingly. Responsibility for selecting trainees should be given to the institution responsible for conducting the struction.

3. The physical location of the institution should be at the institution responsible for conducting the instruction. It was difficult in the Traverse City Institute for the instructional staff coming from Oregon to anticipate all the necessary resource needs before departing for Michigan with the result that several desirable items were not available when their need became evident. In another sense, many needs cannot be anticipated prior to involvement with participants; but if the institute were held at the instructional staffs' institution, all related research and development materials in the agency can easily be drawn upon at very short notice.

APPENDIX A

List of Participants

APPENDIX A

LIST OF PARTICIPANTS
RESEARCH TRAINING INSTITUTE
Traverse City, August 19 to 30, 1968
as of August 14

NAME	ADDRESS
Glen E. Allen	S. Colorado State College, Pueblo, Colorado 81005
Ronald Appleman	Northern Oklahoma College, Tonkawa, Oklahoma 74653
Francis X. Brady	Elmira College, Elmira, N. Y.
Charles Bailey	LeMoyne College, Memphis, Tennessee
C. H. Chapman	Coldwater Exempted Village Schools, 310 N. Second Street Coldwater, Ohio 45828
William H. Clements	Wisconsin State University, Stevens Point, Wis., 54481
Charles R. Colvin	State University College, Fredonia, N. Y.
Sister Maureen Connors	Ursuline College for Women, 2600 Lander Rd., Cleveland, Ohio 44124
Charles W. Cook	Carroll College, Waukesha, Wisconsin
Marianne Cook	Merrill-Palmer Institute, 71 E. Ferry, Detroit, Mich. 48202
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Anthony Debors	University of Dayton, Dayton, Ohio 45409
Anthony M. Deiulio	State University College, Fredonia, N. Y.
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John M. Dodd	State University College, Buffalo, N. Y. 14222
Andrew S. Edwards	Georgia Southern College, Statesboro, Georgia 30458
Doris Epstein	Research Training, Div. of Higher Education, BR, 400 Maryland Ave., S. W., Washington, D. C. 20202

Eldon E. Fahs	Manchester College, N. Manchester, Indiana
Howard Fortney	Livingston University, Livingston, Alabama
George Gifford	Corning Community College, Corning, N. Y.
Sister Gilmary	Marygrove College, Detroit, Michigan 48221
Fritz Grupe	College Center of the Finger Lakes, Corning, N. Y.
W. Phillip Hefley	601 E. 12th, Kansas City, Missouri 64106
Peter Hill	Monmouth College, Monmouth, Illinois
Paul C. Holman	Wisconsin State University, Stevens Point, Wis. 54481
DeField T. Holmes	Central State University, Wilberforce, Ohio
Henry Houser	Knox College, Galesburg, Illinois
David Johnson	Luther College, Decorah, Iowa
Francis J. Kerins	Loretto Heights College, 3001 S. Federal Blvd.
Byron L. Kerns	Millikin University, Decatur, Illinois 62522
David King	State University College, Oswego, N. Y. 13126
Jerry Knoblich	Jamestown College, Jamestown, N. Dakota 58401
Robert C. Koepper	Cleveland State University, 24th & Euclid Avenue, Cleveland, Ohio 44115
Leslie Lewis	Southeastern State College, Durant, Oklahoma 74701
Terry Luce	Tulsa University, Tulsa, Oklahoma 74104
Kemp Mabry	Georgia Southern College, Statesboro, Georgia 30458
Sister M. Madonna	Madonna College, Livonia, Michigan 48150
Lewis R. Marcuson	Box 1283, Wilmington College, Wilmington, Ohio
J. Masuoka	Fiske University, Nashville, Tennessee
Roy Maxwell	East Central State College, Ada, Oklahoma 74821
James McNally	State University College, Geneseo, N. Y.

Paul R. Messier	Office of Education/DHEW, 400 Maryland Ave., S. W., Washington, D. C. 20202
Jack E. Miller	College of Education, Memphis State University, Memphis, Tennessee
Andre W. Moore	Clark College, Atlanta, Georgia 30314
John A. Morrow	Office of Education/DHEW, 220 Seventh Street, Charlottesville, Va. 22901
John Muller	Roberts Wesleyan College, North Chili, N. Y.
Edward Murray	Loretto Heights College, 3001 S. Federal Blvd. Denver, Colorado 80236
Billie Joe Naylor	Freed-Hardeman College, Henderson, Tennessee
Gerard Neptune	Alabama State College, Montgomery, Alabama
Walter Neusom	Ithaca College, Ithaca, N. Y. 14850
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Herman W. Sartor	Savannah State College, Savannah, Georgia
Sister Mary Rosita Schiller	Mercy College, Detroit, Michigan 48219
William W. Stokes	Armstrong State College, Savannah, Georgia
Theodore A. Weissbach	Talladega College, Talladega, Alabama 35160
Sister Mary Louise Werner	St. John College, Cathedral Square, Cleveland, Ohio 44144

APPENDIX B

Schedule for the Institute

APPENDIX B

NATIONAL RESEARCH TRAINING INSTITUTE

Traverse City, Michigan

Official Institute Schedule

	8:00-11:30 a.m.	1:00-4:30 p.m.*	7:00-10:00 p.m.
Sunday August 18	Dormitory check-in.		
Monday August 19	Section I-Orientation (Dr. Edling)	Orientation cont. & Independent Study- Specify'g Objectives	Social Event
Tuesday August 20	Section I-Practice Session-Specifying Objectives. (Dr. Paulson)	Small Grp. Session- Specify'g Objectives (Dr. Edling-Staff)	Independent Study- Objective Analysis
Wednesday August 21	Section I-Practice Sess.-Obj. Analysis (Dr. Twelker)	Small Grp. Session- Objective Analysis	Independent Study- Instruc. Syst. Dev.
Thursday August 22	Section I-Practice Sess.-Instr. Syst.Dev. (Dr. Hamreus)	Small Grp. Session- Instruc. Syst. Dev. (Dr. Twelker-Stf.) 3:00 Large Grp. Sess.- Evaluation (Dr. Paulson)	Independent Study- Measurement
Friday August 23	Section I-Practice Sess.-Measurement (Dr. Schalock)	Small Grp. Session- Measurement (Dr. Hamreus-Staff)	Independent Study- Research Design

*At 4:30 p.m. to 5:00 p.m. daily there will be a general discussion session in the auditorium to evaluate and clarify issues raised during the day.

Saturday August 24	Independent Study - Research Design or Proposal Preparation
Sunday August 25	Free

Official Institute Schedule
(Second Week)

	8:00-11:30 a.m.	1:00-4:30 p.m.*	7:00-10:00 p.m.
Monday August 26	Section I-Practice Sess.-Res. Design (Dr. Crawford)	Small Grp. Session-Research Design (Dr. Schalock-Stf.)	Independent Study-Data Analysis I
Tuesday August 27	Section I-Practice Sess.-Data Anal. I (Dr. Beaird)	Small Grp. Session-Data Analysis I (Dr. Crawford-Stf.)	Independent Study-Data Analysis II
Wednesday August 28	Section I-Practice Sess.-Data Anal. II (Dr. Beaird)	Small Grp. Session-Data Analysis II (Dr. Crawford-Stf.)	Ind. Study-Proposal & Report Writing
Thursday August 29	Section I-Practice Sess.-Proposal & Report Writing (Dr. Crawford)	Sml.Grp.Sess.-Prop & Report Writing (Dr. Beaird-Stf.) 3:00 Research Management (Dr. Edling	Review all sections
	Section II-Sml.Grp. Sess.-Data Anl. II (Dr. Beaird-Staff)	Prac.Sess.-Proposal & Report Writing (Dr. Crawford)	Social Event
Friday August 30	Section I-Final Criterion Meas. (Dr. Edling)	Summary & Evaluation of Institute-Dormitory Check-out (Dr. Edling)	

*At 4:30 p.m. to 5:00 p.m. daily there will be a general discussion session in the auditorium to evaluate and clarify issues raised during the day.

Participants may make travel departure schedules after 3:00 p.m. Friday.

National Research Training Institute

STAFF ASSIGNMENTS

Monday, August 19
AM - Orientation (Jack) all staff at 9:30 AM
PM - Input (Study Behavioral Objectives)

Tuesday, August 20
AM - Behavioral Objectives (Bud)
PM - Small Group (Jack E., Jack C., Jim, Del, Dale)

Wednesday, August 21
AM - Objective Analysis (Paul)
PM - Small Group (Edling, Crawford, Beaird, Schalock & Paulson)

Thursday, August 22
AM - Prototype Development (Dale)
PM - Small Group (Jack E., Bud, Paul, Jim, Dale)

Saturday and Sunday
Free Time

Monday, August 26
AM - Design (Jack C.)
PM - Small Group (Ed, Bud, Del, Dale)

Tuesday, August 27
AM - Data Analysis (Jim)
PM - Small Group (Ed, Crawford, Del, Bud, Paul)

Wednesday, August 28
AM - Data Analysis (Jim)
PM - Small group (Ed, Del, Bud, Paul, Dale)

Thursday, August 29
AM - Proposal (Crawford)
Management (Jack) 3:00 PM
PM - Small Group (Ed, Del, Bud, Paul, Jim)
(Jack C., Bud, Del, Dale free to leave at 3:00 PM)

Friday, August 30
AM - Evaluation (Examination) Jack, Jim, Paul
PM - Evaluation - Jack, Jim, Paul

APPENDIX C

Post - Tests

I. Behavioral Objectives Test

1. One way in which a written behavioral objective for teaching may differ from a non-behavioral objective is that the behavioral objective always specifies:
   A. Teaching methods
   B. Teacher behavior
   C. Length of a teaching unit
   D. Criteria for measurement.

2. An "objective," as it has been defined for the purposes of writing behavioral objectives, denotes:
   A. A goal that a teacher intends students to accomplish
   B. A desired goal for students to accomplish
   C. A goal for teachers to accomplish in their teaching methods
   D. A goal teachers would like to accomplish with their students

3. Generally, the most valid indications of student behavior that are related to a behavioral objective are those which:
   A. Reflect the objective indirectly
   B. Foster democratic ideals
   C. Allow the student to express himself
   D. Are linked directly with the objective

4. The following verbs might be used in writing behavioral objectives concerning the testing of geography. Which verb would require the least clarification in a behavioral objective?
   A. Understand
   B. Draw
   C. Locate
   D. Identify

5. The following verbs might be used in writing a behavioral objective for teaching high school English. Which verb would require the least clarification of a behavioral objective?
   A. Write
   B. Appreciate
   C. Illustrate
   D. Summarize

6. In a behavioral objective, the audience is:
   A. All the students in a particular grade or level
   B. Some of the students in a particular grade or level
   C. A group of students who are expected to reach the criterion in the behavioral objective
   D. A group of students who behaved as the objective indicates

7. The "conditions" of a behavioral objective specify
   A. The setting in which the students' behavior is to occur
   B. The actions which the teacher will observe
   C. The actions of the leader
   D. Criteria for measuring the student behavior

8. The "behavioral" aspect of a behavioral objective specifies:
   A. Teacher behavior
   B. Pupil behavior
   C. Behavioral conditions
   D. Measurement of behavior

II.

From each of the following groups of objectives select the one objective which is most nearly stated in behavioral terms.

9. A. To teach the students how to build a 3 x 5 inch jewel box...
   B. The student will learn the principles of constructing small boxes...
   C. Each 10th grade shop student will build a 3 x 5 inch jewel box...
   D. To show 10th grade students the proper way to construct a 3 x 5 inch box...

10. A. To remember the names of the ten provinces of Canada in such a way as to...
    B. To learn and remember the names of the ten provinces of Canada...
    C. To name and label the ten provinces of Canada on a blank map showing only...
    D. To appreciate the importance of the ten provinces of Canada...

11. A. To learn the names of the different latitudes of...
    B. To write on an outline map the names of the different latitudes of...
    C. To know the names of the different latitudes of...
    D. To remember how to identify the different latitudes of...

12. A. To teach the fundamentals of diagraming electrical circuits...
    B. To learn the fundamentals of diagraming electrical circuits...
    C. To diagram an electric circuit with all the fundamentals...
    D. To know how to diagram an electrical circuit.

13. A. To define the terms decagon, geometry, and equilateral...
    B. To learn the terms decagon, geometry and equilateral...
    C. To know the concepts decagon, geometry and equilateral...
    D. To understand the terms decagon, geometry and equilateral...

14. A. To explore the identification of various types of vegetation...
    B. To name and describe in writing ten types of vegeation...
    C. To learn the names of ten different types of vegetation...
    D. To know the names of ten different types of vegetation...

15. A. To point out five essential points on a map...
    B. To learn about five essential points on a map...
    C. To know and understand five essential points on a map...
    D. To appreciate the value of knowing five essential points on a map...

III.

From each of the following groups of behavioral objectives select the one that most accurately describes the desired behaviors.

16. A. Locate ten major oceans, bays and straits on an outline map.
    B. Identify ten major oceans, bays and straits on an outline map.
    C. Write the names of ten major oceans, bays and straits on an outline map.
    D. Be able to recognize ten major oceans, bays and straits on an outline map.

17. A. To send a four-word message by Morse code with a blink light.
    B. To send a Morse code message.
    C. To send a message with a blink light.
    D. To send a message using a code.

18. A. Must be able to read Spanish writing.
    B. Must translate Spanish into English verbally.
    C. Must read a Spanish paragraph and translate orally into English.
    D. Must be able to tell the differences between languages.

19. A. Must write a Campbell style library paper of at least ten pages.
    B. Must show an ability to write a library paper.
    C. Must write a Campbell style library paper and finish it.
    D. Must be able to write a paper of ten pages or more.

20. A. Must give 4 examples of methods used to teach biology.
    B. Must write examples of 4 basic instructional techniques in biology.
    C. Must demonstrate an ability to teach biology 4 different ways.
    D. Must show 4 examples of how to teach biology.

21. A. Find the ten largest cities in Canada.
    B. Locate the position of each of the ten largest cities in Canada.
    C. Write a list containing the ten largest cities in Canada in order of size.
    D. Recognize the rank of each of the ten largest cities in Canada.

22. A. Write on an isothermal map with a red pencil accurately.
    B. Find the three spots on an isothermal map with heaviest rainfall.
    C. Mark with a red pencil the 3 areas on an isothermal map with heaviest rainfall.
    D. Locate and recognize areas of heavy rainfall on an isothermal map.

IV.

From each of the following groups of statements select the one which most clearly specifies an acceptable level of performance.

23. A. To write a topic sentence suitable for three given related sentences.
    B. To write a good topic sentence without error.
    C. To write accurately a topic sentence in 3 minutes.
    D. To write a sentence for any topic.

24. A. To obtain a score of 50% on a final test for the course.
    B. Get a score of 50 or more on a 100 item final.
    C. Score better than at least half the class on the final test in this course.
    D. Must be able to answer correctly at least 50% of the items on a 100 question true-false test.

25. A. Write the names of the Canadian provinces on an outline map.
    B. Write the ten provinces on an outline map provided in class.
    C. Write the names of at least 7 of the 10 Canadian provinces in a 5 minute period.
    D. In five minutes write the names of ten provinces on a Canadian map.

26. A. To underline verbs in sentences accurately.
    B. To locate and underline verbs in sentences correctly.
    C. To underline all verbs in 10 sentences in 15 minutes with 2 or fewer errors.
    D. To write all verbs from 10 sentences on a separate sheet of paper.

27. A. By labeling a given outline map of waterways correctly within ½ hour.
    B. By being able to look at an outline map and locate waterways correctly.
    C. By placing waterways on an outline map accurately.
    D. By labeling without error all the waterways on an outline map in 30 minutes.

28. A. Must compute accurately to 1 decimal place at least 20 of 30 given division problems.
    B. Must work out long division problems in such a way as to demonstrate ability.
    C. Must finish accurately an assignment calling for solution of long division.
    D. Must be able to work 20 long division problems in 30 minutes.

29. A. Must be able to keep time to a given record of music.
    B. Must clap hands in 4/4 rhythm through ten bars of "Ten Little Indians."
    C. Must correctly clap in 4/4 rhythm, 4 counts in each measure, to a recording of "Ten Little Indians."
    D. Must be able to demonstrate the ability to keep time to a given record.

V.

From each of the following groups of statements select those which describe a condition under which an objective is to be measured.

30. A. Must be able to identify cones, cylinders, and prisms.
    B. Given a set of geometric shapes
    C. Within a period of 30 minutes with less than 3 errors
    D. Students in a 10th grade Geometry class

31. A. Without the aid of references
    B. 33 correct out of a possible 50
    C. 9th grade geography students
    D. Select the proper location of major rivers.

32. A. Compute the area of a circle.
    B. Without the aid of a slide rule.
    C. Following the proper formulas.
    D. 9th grade algebra students.

33. A. Given a problem of the following class.
    B. Select the correct answer in 60% of the class.
    C. Be able to answer correctly
    D. The entire 12 grade calculus group

34. A. In a period of less than 1 hour
    B. Without the aid of a reference map
    C. Find the location of a major continent
    D. Correctly in 40% of all cases

35. A. By arranging parallel lines on a given map
    B. The student will identify and label
    C. Three of the basic map projections
    D. Will spell all three correctly in a period of 5 minutes

36. A. The student will solve an algebraic equation
    B. Given a linear equation with one unknown
    C. Within a period of 40 minutes
    D. And follow the correct procedures

VI.

Each of the following statements is a part of a behavioral objective. For each statement select the answer which best describes what the statement refers to in the objective.

37. ..within a period of 20 minutes...
    A. Audience
    B. Behavior
    C. Condition
    D. Degree

38. ..the first year college geography class...
    A. Audience
    B. Behavior
    C. Condition
    D. Degree

39. ..given a set of carpenters tools...
    A. Audience
    B. Behavior
    C. Condition
    D. Degree

40. ..without the use of references...
    A. Audience
    B. Behavior
    C. Condition
    D. Degree

41. ..all auto repair men in electrical circuiting will...
    A. Audience
    B. Behavior
    C. Condition
    D. Degree

42. ..locate and label...
    A. Audience
    B. Behavior
    C. Condition
    D. Degree

43. ..with a slide projector and slides...
    A. Audience
    B. Behavior
    C. Condition
    D. Degree

44. ..identify the areas containing salt, phosphorous and...
    A. Audience
    B. Behavior
    C. Condition
    D. Degree

VII.

The following behavioral objectives are followed by a list of the four basic requirements necessary for a well stated objective. Select that requirement which you feel is <u>least</u> adequately met, or has been omitted altogether.

45. The sixth grade social studies student, given a slate outline map, will write the names of continents on it.
    A. Audience
    B. Behavior
    C. Condition
    D. Degree

46. Given roughly circular shapes with various arrows indicating direction the student shall select without error in a 5 minute period all those whose arrows indicate a clockwise rotation.
    A. Audience
    B. Behavior
    C. Condition
    D. Degree

47. The ninth grade social studies student will locate and name at least 4 of the 5 climatic areas of Canada.
    A. Audience
    B. Behavior
    C. Condition
    D. Degree

48. By the end of two months they should be able to type 20 words per minute for a period of five minutes with less than three errors.
    A. Audience
    B. Behavior
    C. Condition
    D. Degree

49. On an outline map provided, ninth grade geography students will identify and label the major rivers of the U.S. and Canada.
    A. Audience
    B. Behavior
    C. Condition
    D. Degree

Objective Analysis
Criterion Test

1. Which of these is a benefit of pre-design in contrast to extemporaneous design?

    a) early planning is diminished.
    b) restoration of the proper emphasis of teacher functions is facilitated.
    c) student study tasks are more closely monitored.

2. A programed instructional booklet exemplifies:

    a) a superficial choice of terminal objectives.
    b) intentional extemporaneous design of the conditions of learning.
    c) pre-design of the conditions of learning.
    d) a wide range of enabling objectives.

3. Pre-design of instruction is a waste of time.

    a) agree
    b) neutral
    c) disagree

4. Since we do not know enough about the learning process, it is impossible to pre-design instruction to make it more effective.

    a) agree
    b) neutral
    c) disagree

5. The best use of an instructor's time is to know his subject matter thoroughly rather than to worry about how to teach it.

    a) agree
    b) nuetral
    c) disagree

6. A student is cheated if he goes to a class when instruction is not pre-designed.

    a) agree
    b) neutral
    c) disagree

7. Pre-design is a poor substitute for extemporaneous design.

a) agree
b) neutral
c) disagree

8. Pre-design will do a lot to improve instruction.

a) agree
b) neutral
c) disagree

9. If I had my way, all instruction would be pre-designed.

a) agree
b) neutral
c) disagree

10. In many subjects, extemporaneous design is all right.

a) agree
b) neutral
c) disagree

11. An objective analysis may produce a "good" hierarchy or a "not-so-good" hierarchy. In the long run, a "good" hierarchy is one that

a) has many levels correctly positioned.
b) includes enabling objectives that are easily accomplished by learners.
c) help the instructor in determining what to teach, and in what sequence to teach it.

12. Which of these terms does <u>not</u> describe "enabling objectives"?

a) Basic factual and conceptual knowledge.
b) Component behavior or skills.
c) Lower order competencies.
d) Format of the instruction.

13. After identifying the enabling objectives the next step is to:

a) Identify the type of learning involved in each objective.
b) Develop an instructional environment which will transform learners into graduates who can perform at the specified level.
c) Design instructional sequences that reflect the basic learning principles.

14. After establishing the terminal objective(s) the designer should ask the following question.

a) What level on the hierarchy of learning is this objective?
b) What media will best facilitate reaching this goal without losing the individualized approach?
c) What would the student have to know to perform this objective successfully?
d) What in the world do I do now?

15. Below is a set of objectives. Two of these are enabling objectives. One is a terminal objective.

1) Represent forces and their directions as parts of triangles.
2) Name parts of a triangle.
3) Name horizontal and vertical components of forces as vectors.

Which is a terminal objective?

a) 1
b) 2
c) 3

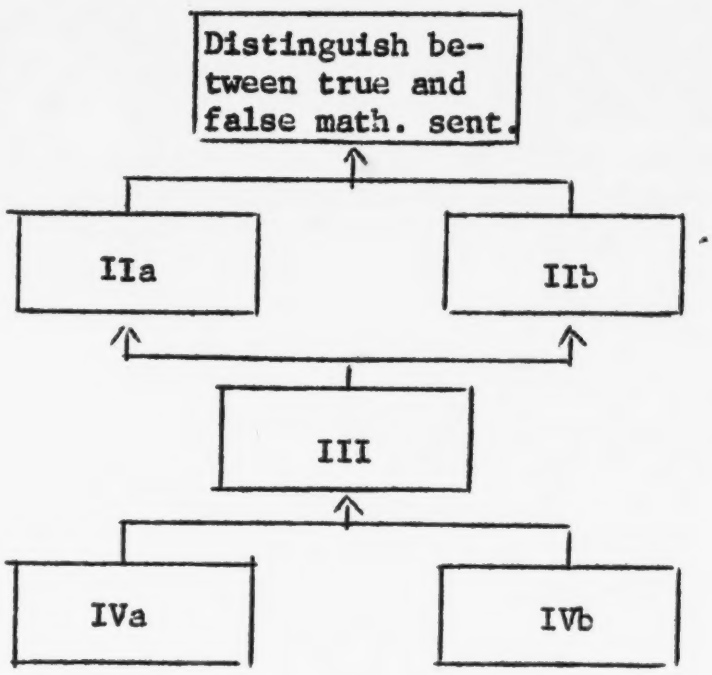
16. Below is a set of objectives. One is a terminal objective and the others are enabling objectives.

1) The student will make a left turn with a standard shift car onto a highway from a stop.
2) The student will discriminate the clutch from the gas pedal and the brake.
3) The student will disengage the clutch.
4) The student will signal for a left turn.

Which of the following is a terminal objective for this set?

a) 1
b) 2
c) 3
d) 4

17. In the following objective analysis, choose the correct ordering of enabling objectives.



1. Distinguish between equal and unequal expressions.
2. Perform operations of multiplication and division
3. Recognize false math sentences
4. Recognize the math sentences
5. Recognize true math sentences

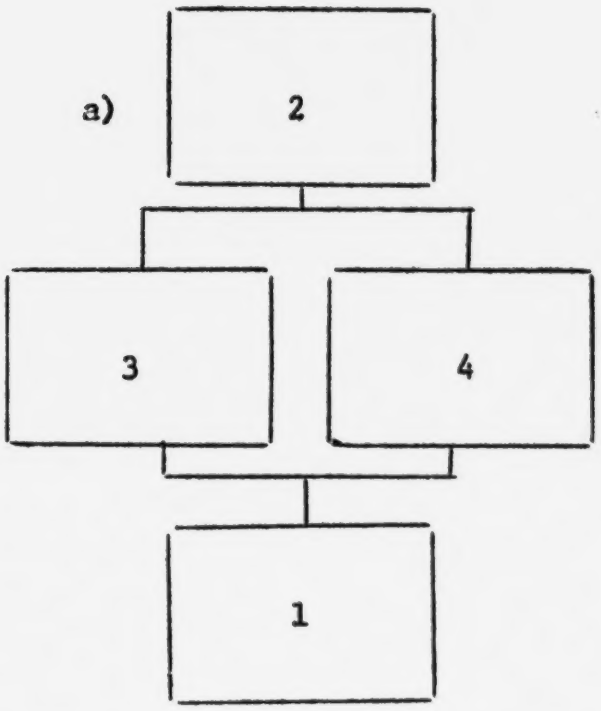
	a.	b.	c.	d.
IIa -	1	2	5	3
IIb -	4	1	3	5
III -	2	4	2	4
IVa -	5	3	4	1
IVb -	3	5	1	2

18. Read the following list of objectives for a math problem.

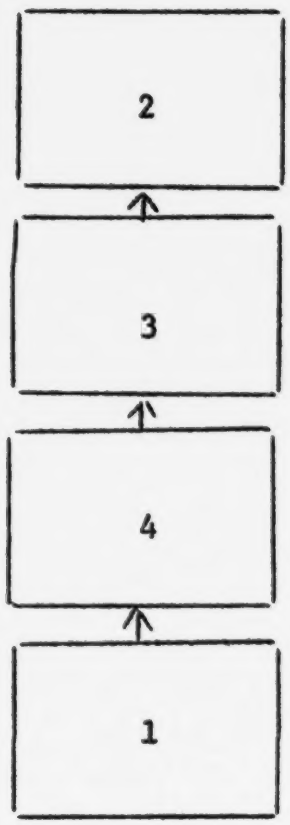
1) Read 1 and 2 place numerals.
2) Multiply a two place whole number by a one place whole number.
3) Multiply a one place whole number by another one place whole number.
4) Add a group of ten(s) to a two place whole number (carrying).

Which diagram is closest to revealing the hierarchy? (The numbers in the squares refer to the numbered objectives above.)

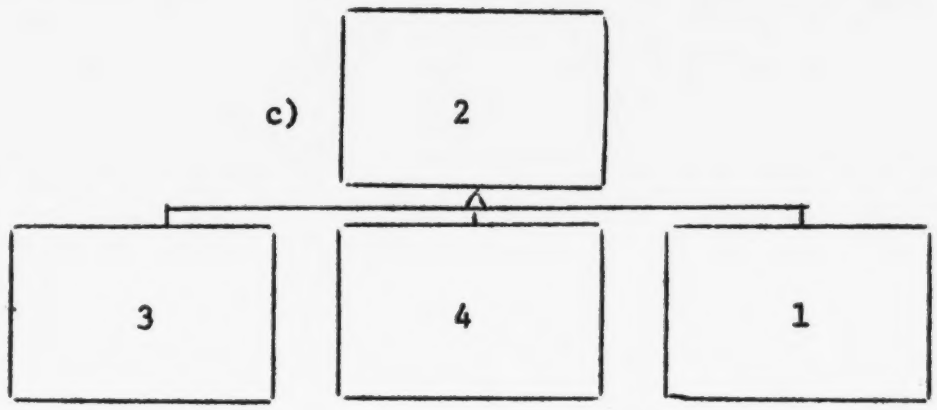
a)



b)



c)



Prototype Development

Criterion Test

For test items 1 - 8, circle the answer you consider best; then push the same letter button on your response station.

1. The stages defined in the instructional system development section are:

   A. Identify behavioral objectives; determine enabling objectives, produce the instructional product; analyze tryout results.
   B. Produce instructional product; conduct tryout of product; analyze tryout results; modify product; recycle.
   C. Determine enabling objectives; produce instructional product; construct performance measures; conduct tryout; analyze results; recycle.
   D. Produce instructional product; construct performance measures; conduct try-out; analyze results; recycle.

2. The process of systematically following the instructional "blue prints" or specifications is to:

   A. Produce the instructional product
   B. Identify types of learning
   C. Identify behavioral objectives
   D. Conduct try out of the product

3. To translate the analysis of try-out results into changes in the instructional materials is to:

   A. Determine enabling objectives
   B. Produce the instructional product
   C. Recycle the development process
   D. Modify the product

4. Obtaining data from observations and other evaluations of the system such that weaknesses can be identified is to:

   A. Construct performance measures
   B. Determine enabling objectives
   C. Conduct try-out of the product
   D. Analyze try-out results

5. The stage of instructional system development whose purpose is to determine whether the instructional system achieves its objective is the:

   A. Analysis of try-out results
   B. Identification of events that provide conditions of learning
   C. Determination of enabling objectives
   D. Production of the instructional product

6. Recycling is concerned with

   A. Determining enabling objectives for all behavioral objectives
   B. Administering and analyzing performance measures
   C. Modifying all phases of the instructional product
   D. Reduplicating all instructional system development stages

7. The team of specialists considered essential to produce the instructional product includes a:

   A. Content specialist, media specialist, behavioral scientist
   B. Production specialist, measurement specialist, field monitor
   C. Subject matter specialist, field monitor, liaison
   D. Production specialist, try out specialist, measurement specialist

8. The continuum of experience model is most useful in

   A. Constructing performance measures
   B. Interpreting results of the try-out
   C. Deciding what media to use
   D. Deciding how to conduct the try-out

For test items 9 - 16, circle whether the statement is true or false and push the same letter button on your response station.

9. Try-out of the instructional product occurs after all development has been completed.

   A. True
   B. False

10. Try-out of the instructional product should only be conducted with learners of appropriate grade and ability level.

A. True
B. False

11. Analysis of try-out results cannot put more confidence in test results than in comments from try-out subjects.

A. True
B. False

12. High error rates on a criterion test indicate the instructional system has portions that are relatively ineffective.

A. True
B. False

13. Try out following instructional system modification is crucial.

A. True
B. False

14. If it is possible, the same subject should be used to try-out all revisions of a particular segment of the new instructional system.

A. True
B. False

15. Product development requires translating instructional specifications into written statements and/or media forms.

A. True
B. False

16. Incidental details having little to do with the basic content of the new instructional system often interfer with effective learning during the try-out.

A. True
B. False

For test items 17 - 23, circle the answer you consider best; when all persons have completed these items you will be instructed to push the appropriate button on your response station.

17. Analysis of try-outs is used to:

    A. Plan modifications to the system
    B. Determine weak teaching strategies
    C. Determine unrealistic specifications
    D. All of these
    E. None of these

18. To measure the first try-out of a segment of a new instructional system

    A. requires a validated test
    B. Demands small groups
    C. Involves only learners
    D. All of these
    E. None of these

19. Modifications to the new instructional system following analysis are planned with:

    A. The same team of specialists used in production
    B. A new team of specialists
    C. The content specialist only
    D. All of these
    E. None of these

20. The process of producing the instructional product involves

    A. Systematically following the instructional specifications
    B. Translating specifications into prototype
    C. liaison between a team of specialists
    D. All of these
    E. None of these

21. To modify the instructional materials following try-out requires

A. Translating the analysis results into changes in the product
B. Planning with the development specialist team
C. Revising enabling objectives
D. All of these
E. None of these

22. In teaching learners to discriminate between sounds produced from an oboe and an English horn, according to the continuum of experience model, use

A. Direct experience
B. Objective codification (audio)
C. Subjective codification (audio)
D. All of these
E. None of these

23. Results of an analysis of the total instructional system indicates that learners achieved all the stated enabling objectives but did not achieve the terminal objective. Which interpretation would be appropriate

A. Enabling objectives were irrelevant to the terminal objective
B. Enabling objective stated required learning steps that were too big.
C. Enabling objectives were too easy
D. All of these
E. None of these

24. During the first session in the Institute on Specifying Behavioral Objectives you wrote two objectives in the area of your discipline. For this part of the test, copy one of those objectives in the space below and do the following: First, identify <u>one</u> enabling objective necessary to attain the terminal behavior you stated. Then:

A. Describe how you would proceed to produce the instructional segment for that enabling objective.
B. Detail how you would plan to try-out the segment produced. In your discussion give consideration to all pertinent aspects of production and try-out covered in this section.

25. The section that follows contains a series of frames taken from a self-instructional program designed to teach 6th grade students concepts and principles of latitude and longitude. Below the frames is a summary of the error rates for each frame resulting from a tryout of the materials with low, average and high ability students drawn from the 5th, 6th and 7th grades. After studying these materials,

A. Judge which frames were bad for which students. (Consider acceptable frames as those not exceeding an average error rate of 14.)

B. Write a brief statement (approximately 100 words), based on the evidence available, indicating what you think caused the frames to be faulty.

C. Briefly describe the steps you would take next to modify the faulty frames.

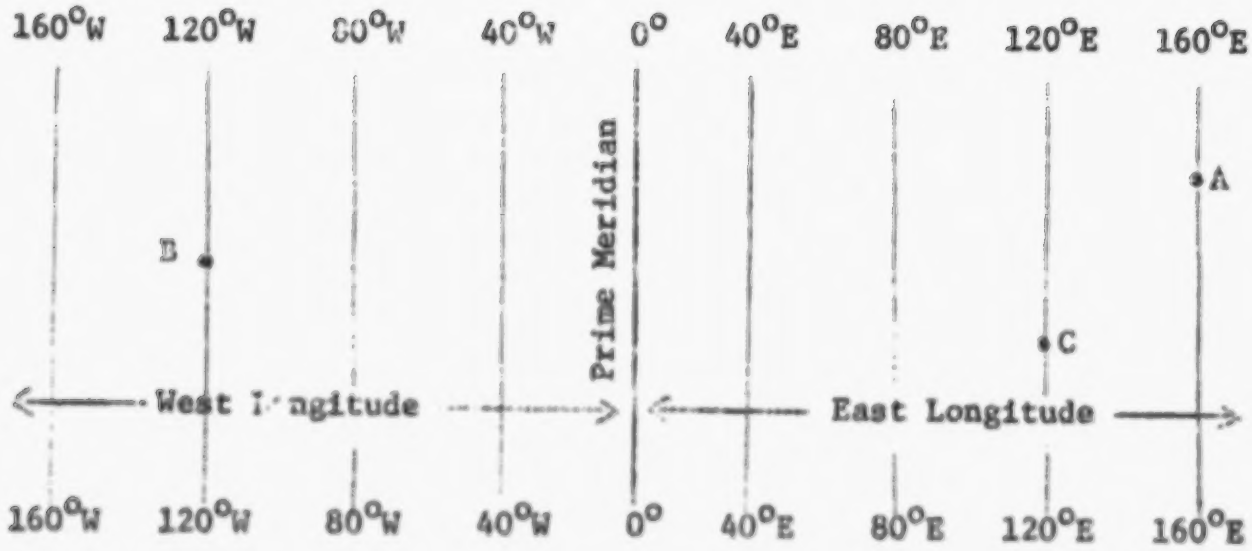


Figure 10

8-30 Look at Figure 10. The longitude of Point A is written_____(?)_____. 160°E

8-31 The longitude of Point B on Figure 10, is written_____(?)_____ 120°W

8-32 The longitude of Point C on Figure 10 is written_____(?)_____ 120°E

8-33 Longitude is _(?)_ - _(?)_ distance or location. east-west

8-34 Longitude lines are numbered from 0 at the ____(?)____ meridian to _(?) °____. prime; 180°

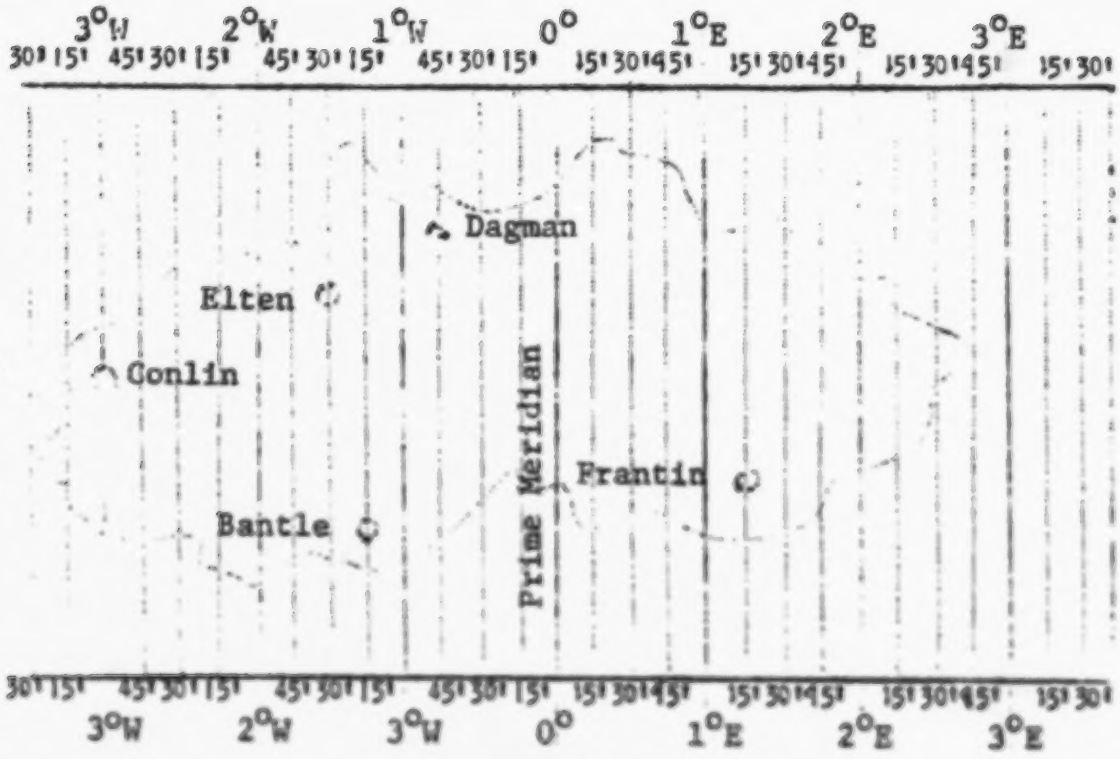


Figure 11

8-35 On Figure 11 we have an imaginary map with with imaginary cities. See if you can read their longitudes. Use Figure 11 for the rest of this set. The longitude of Conlin is (?) ° (?). 3°W

8-36 The longitude of Elten is (?) ° (?) ' (?). 1°30'W

8-37 The longitude of Dagman is (?) ° (?) ' (?) 0°45'W

8-38 The longitude of Frantin is (?). 1°15'E

8-39 The longitude of Bantle is (?). 1°15'W

Error Rates Per Frame by Grade and Ability Level

Frame Number	5 Low N=18	5 Ave. N=16	5 High N=18	6 Low N=9	6 Ave. N=19	6 High N=20	7 Low N=12	7 Ave. N=14	7 High N=5
8-30	22	0	6	11	5	0	0	0	0
8-31	6	6	6	11	0	0	0	0	0
8-32	22	6	0	0	11	5	0	7	0
8-33	22	13	0	11	11	0	0	7	0
8-34	17	19	6	11	11	0	8	0	0
8-35	33	50	28	44	26	5	17	7	0
8-36	39	38	23	44	26	10	25	21	0
8-37	61	31	17	44	32	10	17	0	0
8-38	22	25	11	22	26	5	17	0	0
8-39	33	19	11	44	42	0	8	0	0

A. Identify those frames judged bad and for which students

Bad Frames	Which Students

B. What caused frames to be faulty?

C. What next steps would you take to modify faulty frames?

TEST OVER TOPIC V: MEASUREMENT

Part I. Foundations

Items appearing in Part I of the test are designed to assess knowledge that is basic to the use of measurement in instructional systems development, evaluation, and research. In responding to the first set of items place a T in front of the items which are true and an F in front of those which are false.

_____ 1. Demonstrating the effectiveness of an instructional system in one school setting nearly always means that it will be effective in another.

_____ 2. The aim of instructional evaluation is to determine whether a particular instructional system brings about the educational outcomes (behavioral objectives) that are intended to derive from it.

_____ 3. Because of the "inexactness" of measurement in education and the behavioral sciences two or more measures should be used to assess any characteristic or

_____ 4. The essential difference between measurement in the physical sciences and the behavioral sciences lies in the fact that physical sciences rely upon direct measurement, i.e., measurement of observable properties, while the behavioral sciences rely upon indirect measurement, i.e., measurement of "indicants" of inferred properties.

_____ 5. The control of "random" error in measurement is one of the most bothersome and difficult problems that educators face in carrying out instructional research and evaluation.

The second set of itmes in Part I of the test involve written responses. In writing these responses keep them brief.

1. A distinction has been made in the chapter between instructional research and instructional evaluation. In what way do the problems of measurement differ for the two?

2. Three distinctions have been made in the present chapter that are basic to essentially all of the thinking that has been outlined in it: (a) the distinction between low inference and high inference measures, (b) the distinction between measures which require only the recording of the data that derive from them and those that require coding or scoring in classification prior to recording, and (c) the distinction between evidence needed in support of the trustworthiness of a measure and evidence needed in support of the accuracy with which a measure is applied. What is the advantage or power that derived from each of these distinctions?

   Low <u>vs</u>. high influence measures:

   Measures which require only recording of the data that derive from them <u>vs</u>. those that require coding and recording:

   Evidence of the trustworthiness of a measure <u>vs</u>. evidence of the accuracy with which a measure is applied:

The position has been taken in the Chapter that any measure, regardless of its level of instrumentation and inference, must have five kinds of evidence marshalled in its support before it can be accepted as trustworthy. These classes of evidence have been labeled respectively, relevance, representativeness, fidelity, accuracy, and consistency. For each of these characteristics (a) define or describe it in such a way as to make clear the dimension of measurement it taps, and (b) indicate how such evidence is obtained.

Relevance:

Representativeness:

Fidelity:

Accuracy:

Consistency:

Part II. Applications

Items appearing in Part II of the test are designed to assess the ability to apply basic knowledge about measurement to the solution of tasks demanding of that knowledge. In responding to the first item identify the elements (properties, traits, characteristics, outcomes) that can be measured only indirectly, i.e., that are hypothetical constructs. Do this by placing a check in front of these elements.

_____ Ability to solve story problems in mathematics

_____ Knowledge of ancient history

_____ Personality

_____ Intelligence

_____ Anxiety

_____ Time required to run the hundred yard dash

_____ Considerateness

_____ Orientation to the use of questions

_____ Citizenship

In responding to the second item in Part II of the test indicate the level(s) of measurement (column 2) that are <u>appropriate and feasible within a school setting</u> for the measurement of the cognitive outcomes listed in column 1. Do this by placing the number descriptive of the level(s) of measurement in front of the cognitive outcome that is to be measured. Where more than one level is appropriate <u>rank them according to the power of the data that would come from each</u>, listing the most powerful first.

_____ Rules governing ba sketball	1. Knowledge level
_____ History of the Eskimo	2. Situational response level 1: Described criterion behavior
_____ Sensitivity to the feelings of others	
_____ Competence in math	3. Situational response level 2: Related criterion behavior
_____ Competence in marbles	
_____ Use of good table manners	4. Situational response level 3: Isomorphic criterion behavior
_____ Reading skill	
_____ Writing skill	
_____ Self confidence	
_____ Tolerance of individual differences	

Part III. Instrument Development

Items appearing in Part III of the test are designed to assess knowledge that is required in order to develop instruments for use in educational measurement. In responding to the first item, match the various attributes of a measure that are listed in column 1 with the phrase in column 2 that most appropriately describes the kind of evidence required in support of that attribute.

_____ Relevance	1. Theoretical clarity of items
_____ Representativeness	2. Conceptual appropriateness of items
_____ Fidelity	3. An individual's scores on a test taken twice with two weeks intervening
_____ Consistency	4. An individual's scores on alternate forms of a test
_____ Construct validity	5. The correlation between an individual's performance on two measures that are known to be related
_____ Accuracy	6. The extent to which an item differentiates between those scoring high and low on a test
	7. The extent to which an item calls for behavior that is isomorphic to the property that is being measured

In responding to the second item in this part of the test indicate the class(es) of measurement (column 2) that are <u>appropriate and feasible within a school setting</u> for the measurement of the cognitive outcomes listed in column 1. Do this by placing the number descriptive of the class(es) of measurement in front of the cognitive outcome to be measured. Where more than one class is appropriate <u>rank them according to the power of the data that would come from each</u>, listing the most powerful first.

_____ Rules governing basketball	1. Interview
_____ History of the Eskimo	2. Systematic observation
_____ Sensitivity to the feelings of others	3. Standardized objective measures (Paper and Pencil)
_____ Competence in math	4. Standardized projective measures (Paper and Pencil)
_____ Competence in marbles	5. Teacher-made tests (Paper and Pencil)
_____ Use of good table manners	6. Unobtrusively obtained products and/or records
_____ Reading skill	7. Unobtrusive observation
_____ Writing skill	
_____ Self confidence	
_____ Tolerance of individual differences	

CRITERION TEST: EXPERIMENTAL DESIGN

Directions: Read the proposal extract and answer the questions that follow.

III. Objectives

The primary objective of the proposed research is to determine whether or not student attitudes towards teaching objectives included in teacher education programs are effectively altered after they have had experience in simulated settings. The experimentation will be designed to answer questions which are specific to the particular experiences included in the materials. The simulation problems are, in this case, limited to situations of a personal-social nature.

Specific questions to be answered are the following:

1. Will the experiences provided through individualized instruction in the simulation facility (as described by Kersh, 1963), produce changes in attitude in a positive direction toward the subject matter of educational psychology?

2. Will changes in attitude become evident after the learner has had experience with one program of 20 problem sequences?

3. Will changes in student attitude maintain in strength following the termination of the learner's experience in the simulated setting?

IV. Procedure

A. General Method and Research Strategy

1. Sample Plan and Procedure. The experimental subjects will be selected from the students at Oregon College of Education majoring in elementary education. They will complete their instruction in the classroom simulator within one academic year of their practice-teaching experience or internship. The subjects will be screened on the basis of previous educational background and experience to insure homogeneity in this regard. Also, they will be screened on the basis of their performance on the pretest of attitude toward specific teaching objectives selected from those included in education courses. In so far as possible, only those students whose performance on the pretest indicates that they are neutral or negative toward the specific teaching objectives will be included. Subsequently, the subjects will be assigned to either

the experimental or the control group randomly on the basis of scholastic aptitude, sex, and other selected variables which otherwise might bias the findings.

2. Treatments. The classroom simulation technique under consideration attempts to create for the student teacher all of the relevant features of a single classroom situation.

In brief, the instructional procedure which has been developed for experimentation with the simulation materials is as follows: First the student teacher (T) is oriented to the simulation facility and to the procedure, then he is given a performance test in the simulated classroom using one of the three programs. The orientation and pretesting procedure takes approximately one and one-half hours per subject. Next, T is given the actual instruction in the simulation facility. The filmed problem sequences of actual classroom situations are presented and T is requested to enact his response to each. Depending upon the reaction of T, the experimentor (E) selectes and projects one of two or three alternative feedback sequences.

3. Controls. The control group will be treated in every respect the same as the experimental group except the individuals in the control group will not experience instruction in the simulated setting. Differences in attitude between the experimental and control groups may be attributed only to experience in the simulation facility.

B. Data Types to be Gathered and Methods to be Used.

As is indicated above, the experimental group will undergo experience in the simulation facility which may be conveniently interrupted at three points: (1) at the end of the pretest period which includes the first 20 problem sequences; (2) after the instructional period, and, (3) after the post-test which terminates the experience in the classroom simulation facility. Criterion tests will be administered to individuals in the experimental group before their experience in the simulation facility begins, and after each of the instructional phases indicated above. Approximately six weeks after termination of the simulation experience, the criterion test will be administered once again. Individuals in the control group, which will not have experience in the simulation facility, will be tested on a time schedule approximating that of individuals in the experimental group.

QUESTIONS:

1. What is the experimental unit?

2. What is/are the experimental treatment(s)?

3. What is the method of assignment?

4. Diagram the design using R's, X's, and O's.

5. List sources of invalidity that are accounted for.

6. List sources of invalidity that are not accounted for.

7. Redesign the proposal, give both new diagram and brief explanation.

Data Analysis I

Criterion Examination

1. Assume that the numbers 6, 13, 24 were taken from a ratio scale. Which of the following sets of numbers would be appropriate substitution?

   a. 13, 20, 31
   b. 24, 52, 96
   c. 11, 25, 47
   d. 1, 6, 14

2. If the numbers 4, 17, 43 were taken from an ordinal scale, which of the following sets would be an appropriate substitution?

   a. 1, 2, 3
   b. 4, 16, 12
   c. 13, 10, 26
   d. none are appropriate

. If the numbers 6, 21, 24 represent an interval scale which set of numbers would be an appropriate substitution?

   a. 11, 40, 45
   b. 12, 42, 48
   c. 18, 63, 72
   d. 21, 35, 39

For each of the following kinds of measures indicate whether the scale is nominal, ordinal, interval, and ratio

4. Human age in years. _____

5. IQ _____

6. Numbers on pages in a book _____

7. Notes on the musical scale _____

8. Temperature on a centigrade scale _____

9. Elapsed time in seconds _____

10. Calendar years _____

11. An investigator wished to determine whether physical coordination training was effective in improving reading effectiveness. He selected a sample of "below grade placement" readers and gave them 20 hours of training in lateral coordination. A second sample was chosen from the same pool of low readers and given no training. For analysis purposes he should consider the samples

    a. independent

    b. related

12. A second investigator studying the same problem selected only one group of low readers and gave them training. He then compared pretraining and post-training reading performance. His samples should be considered

    _____

13. A third investigator thought that differences in training effectiveness might be expected for boys and girls. He designed his study to have training and no training groups of boys and girls. How many samples would be required for analysis purposes?

    _____

14. The null hypothesis which states that "the differences between means and variances of samples are no greater than differences due to the vagaries of random sampling from a single, normally distributed, infinite population," is best suited for

    a. causal-comparative studies
    b. experimental studies
    c. exploratory studies
    d. studies of physical characteristics only.

15. Causal-comparative studies differ from experimental studies in that

    a. Causal-comparative studies look for differences while experimental studies only look for change.
    b. Causal-comparative studies attend to differences in means and variances while experimental studies attend only to differences in means.
    c. Causal-comparative studies seek explanations on the basis of some characteristic of subjects, while experimental studies seek to determine effects of an additional influence.
    d. The two are synonymous.

16. All too often investigators state their null hypothesis merely as "the samples did not differ." This leads to confusion because

    a. The samples are not adequately described.
    b. The dependent variable is undefined.
    c. The analysis technique is unstated.
    d. The basic assumptions of sampling are omitted.

For each of the following research problems indicate which null hypothesis (I, II, or III) is most appropriate.

17. An investigator wished to determine if right-handed or left-handed baseball pitchers revealed greater eccentricities as measured by Karl Olliver Obvious Key Induction Examination. He chose random samples of 50 right-handed and left-handed pitchers from rosters of the teams in the American, National, and Pacific Coast leagues.

    _____

18. After selecting three random samples of sixth grade students, an investigator gave one group intensive training in problem solving, a second group a similar amount of training in logic, and no training to a third group. He then tested the creative abilities of the three groups.

    _____

19. An investigator wished to determine whether school administrators were more effective after completing his course. He watched his class members with other administrators in his state on the basis of sex, age, years of administrative experience, and number of hours of graduate credit.

    _____

20. An investigator wished to varify his observation that boys were more quantitatively inclined than girls. He selected random samples of 10th grade boys and girls enrolled in his high school.

    _____

Data Analysis II

Criterion Examination

For each of the following research situations describe the appropriate analysis technique.

1. The investigator wished to determine whether or not achievement in arithmetic, as measured by a standardized test reporting scores in grade placement equivalents was related to nonverbal I.Q.

2. An investigator asked the question "is college attendance predicted by high school grade point average, size of graduating class, and SAT verbal scores?"

3. A group of judges observed teaching behavior exhibited by 25 student teachers and ranked them according to their effectiveness. The investigators wished to determine if these rankings were related to average grades in professional courses received by the subjects.

4. An investigator determined the validity of his test by showing that persons who scored higher on his test completed their degree programs while those who scored lower did not complete their degrees. This relationship could best be described by:

5. To evaluate the effectiveness of a set of instructional materials, the researcher administered pre- and post-training tests (25-item, multiple-choice test) to a group of college freshman English students.

6. A college student personnel officer wished to know whether purchase of activities tickets differed among students living in dormitories, living in off-campus apartments or commuting from home.

7. Reaction times were recorded for three types of students, at four different times of the day, under two temperature conditions for five consecutive days.

8. A college political science professor was interested in determining whether men or women tended to participate more frequently in anti-Viet Nam demonstrations held on campuses. All students enrolled in political science courses were polled.

9. A biology instructor teaching two sections of bacteriology required weekly lab attendance for members of one class and compared their performance on his final exam with performance of the second class which experienced no lab sessions.

10. A sales manager was interested in determining which of several characteristics (annual income, age, size of family, etc.) were most accurate in differentiating Cadillac buyers from Corvair buyers.

11. A dean of women postulated that women enrolled in the College of Education were more attractive than women enrolled in the College of Arts and Sciences. Over a five year period she recorded the college affiliation of all women who were finalists in the 10 separate beauty contests held each year.

12. A curious physiological psychology major wished to determine whether scholastic aptitude (SAT verbal score) was related to sex (male and female).

13. A college golf coach wished to determine whether there was a relationship between the order of finish in his conference tournament and season average scores of his team members.

14. Ten pairs of identical twins were identified by a psychologist. At random one twin from each pair was assigned to attend nursery school for one term. At the end of the term the psychologist obtained measures of social adaptivity for all 20 twins. Scores on the social adaptivity scale were such that they could be ranked in order of absolute magnitude.

15. An investigator wishes to determine whether the 20 items on his test differ in difficulty. He administers the test to 75 subjects and records pass-fail information for each itme for each subject.

16. An investigator wished to determine whether there was any association between social class status and choice of high school curriculum. In a large high school he recorded the number of students in each of five social classes which chose each of three curricula.

APPENDIX D

Written Evaluation Form

APPENDIX D

NATIONAL RESEARCH TRAINING INSTITUTE
EVALUATION QUESTIONNAIRE

Your constructive comments can directly benefit future participants in this institute, by helping the staff determine which of the elements in our instructional program should be retained in their present form, which should be modified, and which should be eliminated. Thank you for your assistance and cooperation.

(1) What instruction did you find most relevant to your professional needs?

(2) In what ways will the things you described in (1) influence the performance of your job in the coming year?

(3) What could be added or changed to make the instruction more useful and effective?

(4) What do you feel should be eliminated or de-emphasized?

(5) Please write at least one positive and one negative comment on each of the following:

(a) Reading materials

(b) Small group activities

(c) Flexibility of the program

(d) Interaction with staff and other participants

(6) On the first day of the institute, you wrote a paragraph on some point of disagreement with the general orientation chapter. How if at all, would you modify now what you wrote then?

(7) There must be something we've overlooked in our evaluation. Please answer (a) or (b) below:

(a) You must be kidding! I have writer's cramp already. Check here. ☐

(b) What I really wanted to tell you, but you never asked, is

_____

_____